Makoto AMANO* & Hideaki OHBA*: **Chromosome number of *Sedum sikokianum* Maxim. (Crassulaceae)**

天野 誠*・大場秀章*: ヒメキリンソウの染色体数

Sedum sikokianum Maxim., a species belonging to the subgenus Aizoon (Crassulaceae), is endemic to Shikoku, west Japan and found in several localities in the higher elevations (Fig. 1). Though it is sometimes confused with *S. kamtschaticum* Fischer (for example, Ohwi 1953) or ignored in the monographic works (Berger 1930, Fröderström 1931), it is clearly and easily distinguishable from *S. kamtschaticum* or other taxa in the subgenus by the opposite leaves, the cymose inflorescence with few flowers and the short flowering stem (about 8 cm) (Moran 1971, Ohba 1982).

S. sikokianum Maxim. is an important species in the subgenus Aizoon because its chromosome number is 2n=16 (Ogawa & Yuasa 1970) which is thought to be the minimum diploid number of this subgenus. As the subgenus is regarded as a polyploid complex from the data of several cytological studies (Soeda 1944, Ogawa & Yuasa 1970, Uhl & Moran 1972, Amano 1990), the determination of the basic number of the subgenus is very important. The chromosome number of *S. sikokianum* was recorded only once in the summary of their lecture (Ogawa & Yuasa 1970). Moran (1971) considered the chromosome number is important to separate *S. sikokianum* from *S. kamtschaticum* Fischer. However, it is still doubtful that the diploid number of *S. sikokianum* is variable, because *S. aizoon* of the same subgenus consist of a complicated polyploid complex. In an analysis of polyploid complex, examination of karyotype of each cytological race is important. Thus, it is necessary to observe the chromosomes of these races for the confirmation of basic number and the description of karyotype.

Materials and methods The living materials of *Sedum sikokianum* were collected from two localities (Mt. Ishizuchi, Saijyo, Ehime and Mt. Ishidate, Monobe, Kami, Kochi). They were cultivated in a garden of University

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Museum, University of Tokyo, Hongo, Tokyo. Root tips were used for the materials. The pretreatment was done with 0.002 M 8-hydroxyquinoline for 3-4 hrs. After pretreatment they were fixed in a mixture of ethanol and acetic acid (3 : 1). For maceration they were incubated with 2% pectinase for 40 min. at 37-40°C after putting in water for 1 hr. They were then stained with 2% aceto-orcein for 12 hrs. and were squashed. Distribution map was made from the data of herbarium specimens in KYO, MAK, TI and TNS.

Result and discussion Chromosome numbers were counted from a single individual from Mt. Ishizuchi and eight individuals from Mt. Ishidate. All of them had same chromosome number: 2n=16. This number is coincident with Ogawa & Yuasa's counts. Ogawa & Yuasa (1970) did not write about the number of individuals used for chromosome observation and the locality where the materials were collected. Moran (1971) wrote that Yuasa counted the number from the material of Mt. Nishiakaishi, Ehime Prefecture. The localities of *Sedum sikokianum* Maxim. are concentrated in the Ishizuchi and the Tsurugi Range of mountains (Fig. 1). We counted the chromosome numbers from the materials collected in both these ranges. The species is presumed here to be lacking in local variation of chromosome numbers.

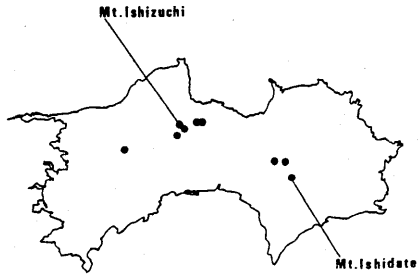

Fig. 1. Geographical distribution of *Sedum sikokianum* based on the data of specimens deposited in MAK, KYO, TI and TNS.

Moran (1971) considered the basic number of *Sedum* subgenus Aizoon as x=8, but Uhl & Moran (1972) considered it as x=16 and ignored Yuasa's count of *S. sikokianum* with the comment "possibly except for *S. sikokianum* Maxim." However, 2n=16 of *S. sikokianum* is observed again in the present study and is the minimum number counted from the species in the subgenus Aizoon. Therefore, the basic number of the subgenus must be thought of as x=8. *S. sikokianum* is the only diploid species so far known in the subgenus (Soeda 1944, Ogawa & Yuasa 1970, Uhl & Moran 1972, Amano 1990).

An ideogram of *S. sikokianum* is shown in Fig. 2. The chromosomes are symmetrical and gradually reduced in size. All chromosome pairs except the shortest one are metacentric or submetacentric. The shortest one is acrocentric

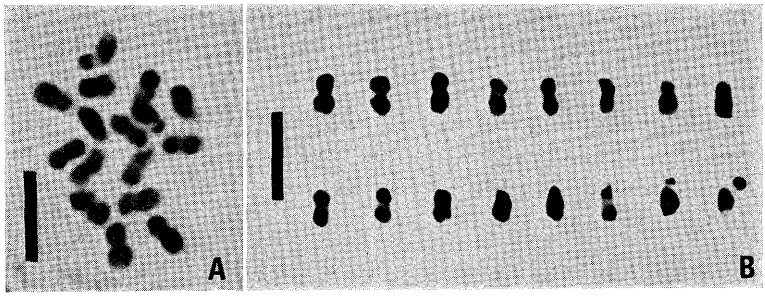

Fig. 2. Photograph of somatic chromosome of *Sedum sikokianum* Maxim. collected from Mt. Ishidate. Bar 5 μ. A: plate, B: ideogram.

and has a satellite with short arm.

In the subgenus Aizoon the leaves of *S. sikokianum* are opposite, while those of other species are alternate. But, in the juvenile stage of *Sedum aizoon* the leaves are apparently opposite. On the derivation of *S. sikokianum* we can have two ideas. One of these is a neotenious derivative from an ancestral type with alternate leaves, and another is an alternative: a relic with primitiveness. In the latter case the opposite status of the leaf is thought as primitive. *S. sikokianum* is distributed in higher mountains in Shikoku where a lot of relict species, for example, *Kirengeshoma palmata* Yatabe, *Saxifraga sendaica* Maxim., *Alectorurus yedoensis* (Maxim.) Makino, *Platycrater arguta* Sieb. et Zucc. and *Pseudotsuga japonica* (Shirasawa) Beissner are found (Hara 1959). From the lowest ploidy level, its rare distribution and distribution pattern, at present, the latter idea (i.e. *S. sikokianum* is a relic) is more suitable for its derivation.

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ヒメキリンソウの染色体数と核型について報告した。染色体数は石槌山の1個体と石立山の8個体で観察し，ともに 2n=16 で，小川・湯浅の結果と一致した。2n=16 は，マンネングサ属キリンソウ亜属ではもっとも少ない数であり，この亜属の基本数は x=8 と考えられる。染色体の長さは勾配的に変化し，もっとも短い染色体対の短腕にサテライトがあった。動原体の位置は，もっとも短い染色体が端部にあるのを除き，中部か次中部に存在した。ヒメキリンソウは，この亜属中唯一の二倍体種であり，遺存的な種が多く分布する四国の石槌山塊と剣山塊に分布が限られ，遺存的な種と考えられる。

□倉田　悟・中池敏之（編）：**日本シダ植物図鑑**—6　881 pp. 1990.　東京大学出版会. ¥18,000. 今まで何回か紹介した本書の第6巻で，ヒカゲノカズラ科・イワヒバ科・ハナヤスリ科・オシダ科など100種類が載っている。これで一応予定した119属600種類が終って1～6巻の種類全部の索引が付いているが，第7巻は日本産の雑種のすべて，第8巻は補遺編ということで完結する予定だという。1979年に第1巻が出て以来2年に1冊の割で発行されたことになるが，途中で倉田氏が亡くなられた後は中池氏が独り編集に当られた。もちろん日本中の「日本シダの会」の会員諸氏が，分布図の1点も逃さないようにと山野を駆け巡って証拠標本を作り，線画を描き生態写真を撮るなど協力を惜しまなかった功績は絶大であり，これなしにはこのような大きな内容の書物は出来なかっただろうと思われる。最初の計画どおり美事にここまで完成を見たことを祝い多くの方々の努力を称えたい。　（伊藤　洋）